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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/716,269

11/17/2003

Damion T. Searls

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04/20/2006

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EXAMINER

DUONG, THO V

ART UNIT

PAPER NUMBER

3753

DATE MAILED: 04/20/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/716,269	SEARLS ET AL.	
	Examiner	Art Unit	
	Tho v. Duong	3753	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 January 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 and 17-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5 and 17-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>1/25/06</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Allowable Subject Matter

The indicated allowability of claims 17-20 and 24-27 are withdrawn in view of the new ground of rejection of Elwell in view Hanranhan. Any inconvenience is regretted.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-5 and 17-27 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter, which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The claimed subject matter of the steps of injecting a phase change material into the cavity and then injecting a plurality of spheres into the phase change material, are not supported by the original disclosure. As described in the specification (page 8) that the phase change material and a number of particles are injected into the cavity but not plurality of particles injected into the phase change material in the cavity.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-5 and 17-27 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claimed subject matters of the steps of injecting a phase

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change material into the cavity and then injecting a plurality of spheres into the phase change material, render the scope of the claim indefinite since the claimed subject matters are not supported by the original disclosure.

Claims 1-5 and 17-27 are further rejected as can be best understood by the examiner in which spheres are injected into the cavity instead of the phase change material.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-2,4 and 5 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Sotani et al. (JP 358110994A). Sotani discloses (figures 1-3) a metal conductive structure (1) having a cavity; the cavity is partially filled with a phase change material (4) and spheres (5); the cavity is sealed and a filling tube, located at end cap (3) is closed. The term “inject” has been defined as “to introduce into something forcefully” by Merriam Webster’s Collegiate Dictionary , 10th Edition. Therefore, filling a material into a closed space is considered to read as “injecting” since the examiner has to interpret the limitation as broadly as it reasonably allows.

Claims 1-2,4, 5, 17-23 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Elwell (US 5,315,154) in view of Hanrahan (US 5,945,217). Elwell discloses (figures 1,7 and column 2, lines 61-65) an apparatus comprising an integrated circuit chip (14), which is known as an integrated circuit die (See US 6,395,991); a copper conductive structure having a pair of symmetrical structures (18,12) having a cavity to encapsulate a phase change material (16), a plurality of fins (12b) formed on the conductive structure; a flat surface (12a) having a foot print larger than the surface of the die; the die (14) thermally coupled to the flat surface of the conductive structure; and a large number of particles (54) of any suitable shape intermixed with the phase change material so that it will enhance the cooling in the phase change material by either conduction or convection. Elwell discloses (figure 11-12) that the phase change material (16) is poured into the cavity through an upper hole or opening of (18). The conductive structure is sealed by closing with structure (12). The term "inject" has been defined as "to introduce into something forcefully" by Merriam Webster's Collegiate Dictionary, 10th Edition. Therefore, pouring is considered to read as "injecting" since the examiner has to interpret the limitation as broadly as it reasonably allows. Elwell substantially discloses all of applicant's claimed invention as discussed above except for the limitation that the particle has a spherical shape. Hanrahan discloses (figure 1 and column 5, lines 12-15) a cooling device that has a die (14) coupled to a conductive structure (10) that encapsulating intermixed particles, which have an aspect ratio 1:1 such as spherical shape to effectively dissipate heat from the die. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use Hanrahan's teaching in Elwell's apparatus to effectively dissipate heat from the die. Since Elwell and Hanrahan are both from the same field of endeavor and/or analogous art, it would

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have been obvious to one having ordinary skill in the art at the time the invention was made to use Hanrahan's teaching in Elwell's apparatus for the purpose of effectively dissipating heat from the die.

Claims 3 and 21-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Elwell and Hanrahan as applied to claims 1 above and further in view of Salyer (US 5,370,814). Elwell and Hanrahan disclose substantially all of applicant's claimed invention as discussed above except for the limitation that the phase change material is a TH58 and the particles have a density about equal to the density of the phase change material. Salyer discloses (figure 1 and column 2, lines 51-59) a mixture of phase change material and particles are contained in a cavity to use as a heat sink device wherein, the particles are silica particles (SiO_2) intermixed with a phase change material of salt hydrates to form a free flowing, conformable powder-like mixture of silica and phase change material to effectively absorb heat from a heat source and minimizing any possible leak since the mixture is rather dry when it is not heated. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use Salyer's teaching in Elwell and Hanrahan's combination device to form a free flowing, conformable powder-like mixture of silica and phase change material to effectively absorb heat from a heat source and minimizing any possible leak since the mixture is rather dry when it is not heated. As regards the limitation of TH58 and the density, Applicant discloses in the specification (page 7, lines 13-30), a few materials of phase change material such as paraffin, hydrated salts and particles such as SiO_2 or sand (silica) that can be used in the system and meet the requirement of TH58 and density. Therefore, Salyer's mixture of silica and salt hydrates is considered to read on the claims.

Claims 24-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sotani (JP 358110994A) in view of Vinz (US 3,911,547). Sotani discloses substantially all of applicant's claimed invention as discussed above except for the limitation that the conductive structure is formed from a pair of symmetrical structures having an approximately one-half of a volume of the cavity. Vinz discloses (figure 2) a heat sink that has a conductive structure is formed by coupling a pair of symmetrical structure (12,13), which has approximately one-half of a volume, for a purpose of forming a cavity without using a large piece of material. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use Vinz's teaching in Sotani's device for a purpose of forming a cavity without using a large piece of material.

Claims 26-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sotani and Vinz as applied to claim 24 above, and further in view of Munekawa et al. (US 5,076,351). Sotani and Vinz substantially disclose all of applicant's claimed invention as discussed above except for the limitation that fins are formed on an external surface of the conductive structure. Munekawa discloses (figures 9-10) fins (66) are brazed on the outside surface of the conductive structure for a purpose of increasing the heat transfer surface area of the conductive structure. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use Munekawa's teaching in the combination device of Sotani and Vinz for a purpose of increasing the heat transfer surface area of the conductive structure.

Conclusion

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The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

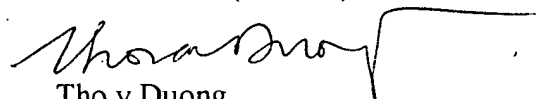
Danis (US 3,815,575) discloses a cooking utensil having spheres inside the utensil.

E. B. Lenning (US 1,528,494) discloses an electric radiator.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tho v. Duong whose telephone number is 571-272-4793. The examiner can normally be reached on M-F (first Friday off).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Keasel Eric can be reached on 571-272-4929. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Tho v Duong
Primary Examiner
Art Unit 3753

TD

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April 15, 2006